CLAIMS

1. A method for treating a complex fluid, comprising:

    a) introducing a supply of complex fluid into a treatment zone, said complex fluid including first and second fluid components that are responsive to light energy;

    b) applying light energy to said complex fluid in said treatment zone, said light energy being supplied from an excimer-based non-laser light source that generates a substantially monochromatic light having a designated wavelength of between 260 nm and 310 nm;

    wherein said light energy from said excimer-based non-laser light source is effective to substantially preserve said first fluid component and to substantially excite said second fluid component.

2. A method according to claim 1, wherein said complex fluid is selected from the group consisting of blood products, pharmaceuticals, injectable solutions and vaccines.

3. A method according to claim 1, further comprising adding a photoactive compound to said complex fluid prior to applying said monochromatic light thereto.

4. A method according to claim 1, wherein said excimer-based non-laser light source includes a system for controlling temperature of said complex fluid throughout application of said monochromatic light thereto.

5. A method according to claim 1, wherein said excimer-based non-laser light source generates said monochromatic light utilizing an excimer gas selected from the group consisting of XeI, Cl_2, XeBr, Br_2, XeCl, filtered XeBr, I_2 and XeF.

6. A method according to claim 1, wherein said complex fluid treatment involves leukocyte reduction and said first fluid component is a carrier fluid.

7. A method according to claim 1, wherein said complex fluid treatment involves inactivation of organisms by disrupting one or more nucleic acids.

8. A method according to claim 1, wherein said complex fluid is a blood product selected from the group consisting of whole blood, plasma, platelets, packed red cells and combinations thereof.

9. A method according to claim 1, wherein said complex fluid treatment involves generation of specific chemical adducts to a photoactive agent, and said first fluid component is a different set of chemical adducts to said photoactive agent.

10. A method according to claim 1, wherein said complex fluid treatment involves chemical synthesis wherein said first fluid component produces a higher yield of a desired chemical compound and said second fluid component reduces yield of said desired chemical compound

11. A method according to claim 1, further comprising mixing said complex fluid during treatment thereof.

12. A method for treating nucleic acid within a complex fluid, comprising:

a) introducing a supply of complex fluid into a treatment zone;

b) adding a photoactive compound to said complex fluid; and

c) applying light energy to said complex fluid and said photoactive compound in said treatment zone, said light energy being supplied from a light source that generates said light energy having a designated wavelength below 340 nm;

wherein said light energy from said light source is effective to substantially excite a nucleic acid and to substantially excite said photoactive compound.

13. A method according to claim 12, wherein said complex fluid is a blood-based product and further includes biological proteins which are inactivated by ultraviolet light.

14. A method according to claim 12, wherein said light source is a non-laser light source and said light energy from the non-laser light source is substantially monochromatic.

15. A method according to claim 12, wherein said light source is configured to produce polychromatic output.

16. A method according to claim 12, wherein said light source selectively adjusts a gas mixture containing a rare gas(es) or halogen(s) so as to produce the polychromatic output.

17. A method according to claim 12, wherein said photoactive compound is riboflavin.

18. A method according to claim 12, wherein said nucleic acid excited by said light energy from said light source is single stranded and belongs to a pathogen.

19. A method according to claim 12, wherein said photoactive compound is effective at inactivating pathogens with double stranded nucleic acid.